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CASE REPORT

A Pilot with Anterior Cruciate Ligament Injury

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Abstract

Anterior cruciate ligament (ACL) rupture is more likely in young people who participate in sports that require pivoting, decelerating, and leaping. The objectives of treatment are to restore knee function, address psychological barriers to active participation, return to flying as soon as possible, prevent further injury and osteoarthritis, besides optimize long-term quality of life.

Practical suggestions are provided for educating and discussing treatment choices with patients, as well as explaining patient-related characteristics linked with a poorer ACL rupture result.

Keywords: Anterior cruciate ligament injuries, Knee joint, Magnetic resonance imaging, Quality of life, Rupture

Introduction

Anterior cruciate ligament (ACL) is a strong knee ligament that arises from the posteromedial section of the femur's lateral condyle, travels anteriorly and inferiorly between the condyles, and connects to the depression in front of the tibia's intercondylar eminence. It is regarded as an important component in the knee joint because it resists anterior tibial translation and rotational stresses. ACL injuries are typically described by patients as a popping sound followed by acute pain and swelling of the knee.[1] The capacity to participate in activities is frequently limited by a sense of instability or moments of giving way. Patients may use the "double fist gesture" to express their feelings of insecurity (i.e., fists facing each other, rotating in a grinding motion). Contact ACL injuries needs a stationary lower leg (i.e., when planted) and twisting with sufficient force to create a tear.[2,3] Around 30 percent of ACL injuries are caused by contact. The remaining 70% of ACL tears are non-contact and occur largely during lower extremity deceleration, with the quadriceps maximally tensed and the knee at or near full extension.[4] The stresses on the ACL in non-contact settings is like that of a knee accident. Quadriceps contraction increases ACL tensile force when the knee is at or near full extension. During these injuries, the hamstrings, which anchor the ACL posteriorly, are typically slightly constricted, especially if the hip is extended and the body weight is on the heel, allowing for excessive forward sliding of the femur on the tibia.[5]

Case Presentation

The index case involves a 27-year-old male, working as a pilot with no underlying medical illness who presented to the clinic with a one week history of right knee pain following twisting injury at workplace. The patient reported immediate swelling and difficulty bearing weight post trauma.

Upon examination, there was moderate swelling with a positive anterior drawer and Lachman raising the suspicion of anterior cruciate ligament injury. A

magnetic resonance imaging (MRI) was requested which revealed a complete ACL tear (Figures 1& 2).

The patient underwent arthroscopic anterior cruciate ligament reconstruction three months following the injury, and was started on standard ACL rehabilitation protocol following which was able to resume to his regular duties at work after six months of progressive rehabilitation which resulted in him having a knee range of motion of 0-120 degrees with stable knee.

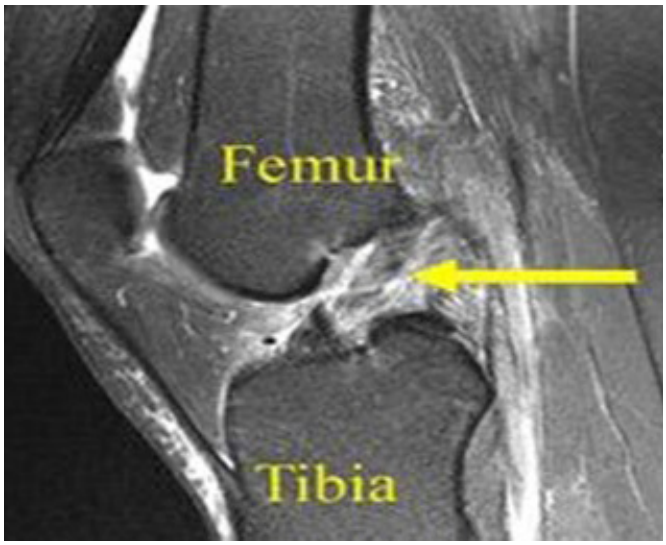

Figure 1: MRI image demonstrates the site of injury

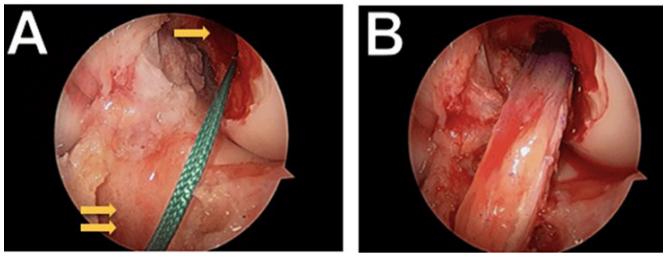

Figure 2: Arthroscopic image (A) of the Ethibond suture used to pass the graft through the femur (single arrow) and tibia (double arrows); graft in position (B)

Discussion

Management of patients with injuries to the ACL of the knee has become one of the most studied topics in musculoskeletal medicine and rehabilitation. Estimates are that approximately two million people worldwide experience ACL injuries annually at the moment of injury, there is an attempt to correct any bending in the knee joint.[6] Excessive quadriceps contraction causes hyperextension of the knee and anterior translation of the tibia. Avulsion fracture of the anterior tibia spine may be found on x-ray.[7] Attempts to prevent ACL injury in hypermobile individuals has increasingly come to the fore, especially among the sports populace. The most basic way is to utilize a knee brace, which is a valuable accessory for sports such as skiing. Other preventative strategies involve improving neuromuscular control of the leg.[8]

In 2013, it was described that the ACL has a smaller cross-sectional area at its mid substance in comparison to its tibial and femoral attachments.[9]

Rehabilitation is the first-line treatment option for ACL rupture, followed by ACL reconstruction (ACLR) in patients who develop functional instability, anterior cruciate ligament reconstruction and post-operative rehabilitation as the first-line treatment, or pre-operative rehabilitation followed by anterior cruciate ligament reconstruction and post-operative rehabilitation.[7] In 2016, a Cochrane review looked at randomized control trial outcomes of adult patients undergoing non-operative management of ACL ruptures in the form of structured rehabilitation alone versus ACLR followed by structured rehabilitation.[10] ACL injuries are diagnosed with a focused history and physical examination, which can yield a high index of suspicion. Although radiographs are useful for ruling out related injuries, MRI is the gold standard for diagnosing ACL damage, with high accuracy.

This case report is unique in that it is the first of its kind reported in Bahrain where an aircraft pilot sustained an ACL injury and was able to return to work within six months of reconstruction following a proper rehabilitation protocol, the presence of complications may be incompatible with flying. Though there is no official waiver that has been issued from the government of Bahrain that states clear instructions, the US Alliance Flight Support waiver was used as a guide to allow this patient the clearance to return to his preinjury level flight duties, the salient features are enumerated below: [11]

- A complete picture of the patient's level of physical activity, limitations, and "normal" documentation
- Orthopedic consultant must state that the knee is asymptomatic, stable, and if surgery was performed, its successful outcome

- Patient must not require medication to control pain
- Documentation of the patient's ability to pass a physical test for the United States Navy (swimming or running)
- Normal physical knee examination, which must document the anterior drawer test, McMurray's test, medial and lateral stability, absence of swelling or effusion, absence of tenderness, and full motion range

Conclusion

Appropriate education about aviation field hazards and how to protect pilots from different injuries including knee joints by using protective equipment and following the instructions will be the first line of preventing the injuries. The major aeromedical concern is the range of motion, strength and functional stability of the knee joint that may affect performance and safety during flight. Therefore, fitness for flying depends on correct treatment and rehabilitation, although ACL complications may delay the pilot's fitness for flying missions.

Patient consent

Obtained and documented

Conflict of Interest

Nil

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